The VISUALLY IMPAIRED STUDENT in the REGULAR CLASSROOM

RESOURCE BOOK

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Introduction

In British Columbia, close to 500 visually impaired students are enrolled in regular classes and receive instruction with their fully sighted peers. However, because over 80 percent of the information acquired during an individual's life is attained through vision, those born without vision or who lose their vision early in life must access information in other ways -- through the use of the other senses, with the help of various communication tools and, above all, through the active and sensitive participation of parents, teachers, related professionals, and peers.

While sighted children have all necessary visual equipment at birth, vision is a learned skill, and even fully sighted children must learn to use their visual equipment. They must develop basic visual skills such as eye-hand coordination, accommodation, fixation, eye-muscle control, recognition, and discrimination. For the child with a visual disorder, such development is likely to be delayed and needs to be taught.

Each child is unique with regard to experience, learning style, learning rate, and the acquisition of specific intellectual and social skills. Each child needs to progress at his or her own rate and be allowed time to become competent at each new skill. It is important, therefore, to assess each child's needs carefully and to plan accordingly.

There is a wide range of visual impairment, each type of impairment representing very different conditions and abilities. For example, children who are congenitally blind experience infancy and childhood differently than children who are adventitiously blinded through illness or accident. Children blind from birth may be unmotivated and should be encouraged to explore and move about. They also will require active intervention as they grow if they are to learn to play and to accomplish the everyday tasks common to all young people.

Visual conditions will vary as well; children with tunnel vision will perform differently from children with cataract, macular degeneration, or refractive errors such as myopia. These aspects of visual impairment will also affect the students in a variety of ways, including focusing, depth perception, visual coordination, and

tracking. Such individual capabilities should be established as early as possible by teachers trained to work with visually impaired students.

From infancy and throughout the preschool years, caregivers should assist visually impaired children in all areas of normal development, including reaching for objects, improving body image, visual stimulation, and locomotor activities. As the children grow older, they also will need to be taught the skills required for effective communication, social acumen, and useful exploration of the environment in the home and in the community.

During the elementary grades, and especially at the high school level, parents and teachers will need to give special consideration to the social skills necessary for successful integration -- the students' ability to make and keep friends and to be part of the peer group.

There is no question that visual impairment can be a distressing social handicap. Visually impaired students often behave in what is experienced by others as unsociable ways and as a result often find themselves isolated in what seems an unfriendly world. However, it must be remembered that it is very hard work for these young people to behave as the sighted world behaves; it is difficult to learn social skills that often have little natural meaning for them, but must be acquired if they are to become part of their peer group.

Difficult as this process may be, integrating visually impaired students is crucial to both their social and academic development. It is essential that parents, teachers, and all personnel working directly with the students have an understanding of vision -- its mechanisms and limitations, the need for assessment and training, and the adaptations required. It is important also to remember that knowledge concerning visual impairment and one's attitude toward it can have a decided impact on the lives of visually impaired students, both at school and at home.

USING THIS RESOURCE BOOK

Ministry provincial curriculum guides are intended for school-aged children as a whole, and as such do not always provide adequate direction for teachers working with students who are visually impaired. Nor do the learning outcomes of the regular curriculum always consider the special educational needs of visually impaired students in terms of content, emphasis, and learning style, even though these outcomes may be consistent with the abilities of many.

When faced with this problem, teachers often are forced to modify the existing curriculum without adequate or consistent guidance, resulting in programs that are not always suited to the skills of individual students.

This resource book is designed for parents and educators with special reference to the classroom teacher. It is intended to supplement provincial curriculum guides and to offer a basic overview of the visually impaired student in the regular classroom.

The resource book is divided into three parts:

- "Visual Impairment: Its Physical Nature" describes the most common types of visual impairment, as well as the quantitative assessment systems required to interpret the significance of particular impairments. It also deals with how impairment affects development, with special reference to the needs of the multi-handicapped visually impaired student.

- "Learning in the School" outlines the responsibilities of those involved in the education of the visually impaired student, with special emphasis on the role of the classroom teacher. Also considered are the key factors affecting student success, the planning and implementation of effective programs, and the social and emotional growth of the visually impaired student.

- "Skill Development" describes a variety of specialized tools required by visually impaired students at preschool, elementary, and secondary levels. Specific subject-area skills are outlined, including suggested ways teachers can modify and adapt the curriculum at each level in order to meet the needs of the visually impaired student.

A glossary of selected terms specific to visual impairment, a bibliography of reference materials, and lists of journals and resource agencies are included.

An additional resource book concerning the visually impaired is available: Orientation and Mobility for the Visually Impaired. Readers are referred, as well, to a half-hour videotape, "The Integration of Visually Impaired Students in the Regular Classroom," developed by the Provincial Media Centre as part of the Chalk Talk series.

Visual Impairment: Its Physical Nature

Visual Impairment: Its Physical Nature

Visually impaired people are not those who simply need glasses to correct their vision; visually impaired people are those who have significant sight loss in both eyes even with the best correction. Impairment may range from moderate to severe to complete loss of sight, creating a need for special provisions in order to facilitate learning.

There are two categories of visual impairment: legally blind and low vision. "Legally blind" is a term that can be misleading, since legally blind people often have some usable vision. Thus, though certification as "legally blind" gives them access to important services from government and private agencies, this certification should not preclude their use of residual vision. Moreover, an educational program should take advantage of any remaining usable vision. "Low vision" is a term applied to visually impaired people who still have significant residual vision, but whose vision capability may overlap into the legally blind category. Low-vision people tend to be print users (with special aids), while those with more severe sight loss are likely to be braille users.

Visual impairment often is classified by age of onset. Congenital defects are a result of eye defects that are present at birth, while adventitious defects are those that occur later in life as a result of illness or accident. The actual age of onset and the level of development before sight loss can be critical factors in the significance of the defect and in the severity of the resulting disability.

THE HUMAN EYE

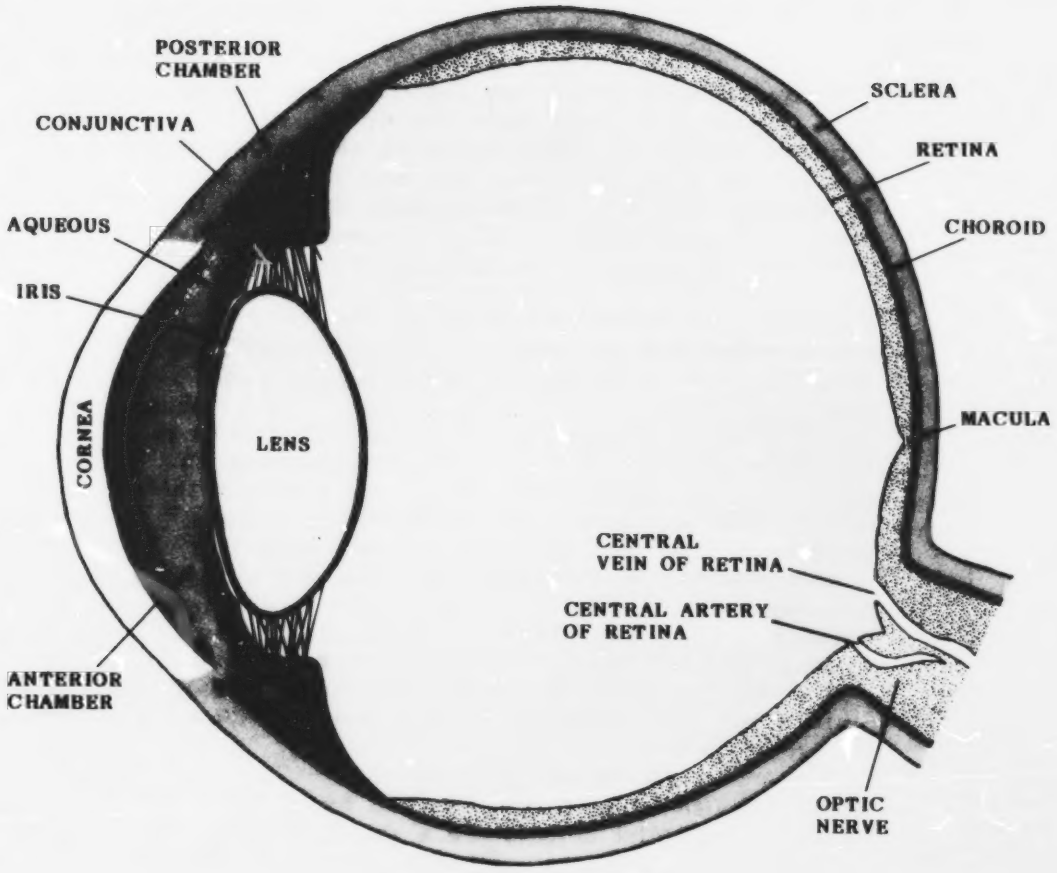


Figure 1

Types of Visual Impairment

The following material outlines some common types of visual impairment. Figures 2, 3, 4 and 5 illustrate how various impairments may affect the functioning of the visual system.[1]

The transparent parts of the eye such as the cornea, lens, or vitreous (see Figure 1) may become clouded so that light cannot get into the eye to create a clear image.

Figure 2

Figure 2 gives some indication of how things might appear through a very cloudy lens (cataract).

The retina is the thin photosensitive layer on the inner surface of the eye that converts patterns of light and color to electrical patterns for transmission to the brain via the optic nerve. If the retina or the optic nerve are diseased or damaged, this image conversion of light to electrical impulses is distorted or incomplete. Figure 3 illustrates how things might appear for a person with sight loss caused by diabetic retinopathy. The degree of sight loss is likely to be more severe with retinal or optic nerve pathology than with clouding of the cornea, lens, or vitreous.

Figure 3

[1]From Visual Defects Simulations by J.M. Gill, Research Unit for the Blind, Brunel University and J.H. Silver, Moorfields Eye Hospital, London; Institute of Ophthalmology, London. Reproduced with permission.

Visual impairment may also be classified in terms of what parts of the visual field are effected.

Most often a central defect occurs when the macula (central part of the retina) is damaged. The macula is the most sensitive part of the retina, having more than 100,000 receptor cells in an area less than 3 millimeters in diameter. It is the area of the retina we normally use for direct gaze and close inspection of detail (e.g., when reading). Sight loss of this kind has a severe effect on concentrated visual tasks. Figure 4 will give an impression of the effect of a central defect, provided the viewer looks directly at the dark patch at the centre and tries to discern the rest of the picture without directly looking at any part of it.

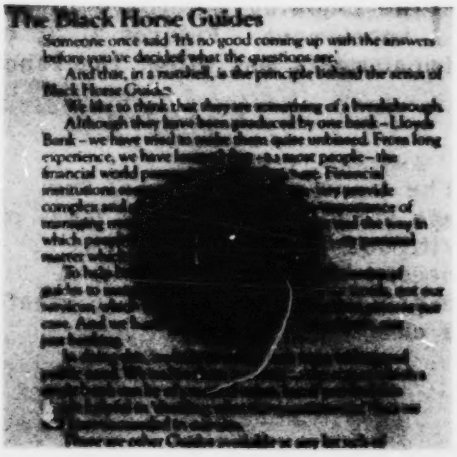


Figure 4

Areas of the retina farther from the macula have fewer receptor cells. This means that even normal, healthy peripheral vision is blurred and indistinct compared to macular vision (one can sense things with peripheral vision but cannot discriminate details). Peripheral vision is not of much use in recognizing detail, but it has a great deal to do with finding one's way around and orienting oneself to surroundings. Figure 5 illustrates the phenomenon often called "tunnel vision," where a person may have completely normal central vision. Such a person might have little trouble reading very small print in a book, but have a great deal of trouble walking across the room to find the book.

Figure 5

Assessment

On the previous pages, emphasis has been placed chiefly on systems for the descriptive classification of visual impairment. In order to interpret further the significance of particular impairments, the following now focuses on quantitative assessment.

VISUAL ACUITY

Central vision usually is measured by means of the Snellen Chart, on which is printed letters of decreasing size, each letter having a standard maximum distance at which a normally sighted person can recognize it. Defective vision is measured against this standard. Thus, 20/70 acuity simply means that a person must be no farther away than 20 feet to read a letter normally visible from a distance of 70 feet.

The whole purpose of acuity testing is to determine the finest detail the eye can see. Acuity of 20/200 represents less vision than 20/70, and 20/70 acuity represents less vision than 20/20 (normal vision). A sample is shown below.

Impairment Classification	SNELLEN DISTANCE ACUITY TEST	
	Feet	Meters
Normal	20/20	6/6
	20/25	6/7.5
	20/30	6/9
	20/40	6/12
	20/60	6/18
Low Vision	20/80	6/24
	20/120	6/36
Legally Blind	20/200	6/60
	20/400	3/60
Light Perception	3/200 (approx.)	1/60

Figure 6 COMPARISON OF ACUITY RATINGS
Indicates the relationship of Snellen ratings to visual impairment classification.

PERIMETRY (PERIPHERAL FIELD MEASUREMENT)

The most important factor in perimetry is the extent of "side" vision, rather than the amount of detail seen. Visual fields are measured in terms of angular distance outward from the line of central gaze. For example, while concentrating on a small central target, how far to the left, right, above, or below that target can a person see another standard-sized target "out of the corner" of the eye?

Precise acuity and perimetry measurements are used to set categories for severity of sight loss. These often are incorporated into government statutes or agency standards for service eligibility, insurance claims, and so on. For example, to be blind in the legal sense is to have visual acuity of 20/200 or less in the better eye with the best possible prescription glasses, or to have a peripheral field no larger than 20 degrees in the better eye. (Normal peripheral field vision is 110 to 145 degrees.)

FUNCTIONAL VISION ASSESSMENT

Functional-vision tests, in contrast to the standard clinical type, are practical tests of visual behavior that are

- conducted in real-life situations as opposed to artificial clinical settings;
- repeated over a period of time and under varying conditions (e.g., changed lighting);
- often better predictors of useful residual vision or the value of magnification aids; and
- a good basis for a program of visual-efficiency training.

One commonly used battery of functional-vision tests has been developed in the United States by Natalie Barraga and J.E. Morris.[2] One sample of a frequently used low-vision reading test card is shown on the following page.

[2]Natalie C. Barraga, and J.E. Morris. Program to Develop Efficiency in Visual Functioning. (Louisville, Ky.: American Printing House for the Blind, 1980)

CNIB LOW VISION READING TEST CARD[3]

JAEGER PRINT SIZE OR EQUIVALENT		METER PRINT SIZE	DISTANT VISION (IN FEET)		POINT PRINT SIZE	COMMON PRINT EQUIVALENT
J30	LEAF	6M	20/300	8425	36	Large headlines
J20	BRAIN	4M	20/200	37691	24	Small headlines Pre-school books
J16	CLEAN	3.2M	20/160	25187	21	Large print books Pre-school books
J12	GREAT	2.5M	20/125	96430	18	Large print books Primary books
J10	WIFE	2M	20/100	82536	14	Book age 7 – 9
J8	DOWN	1.6M	20/80	47109	12	Book age 9 – 12 Typewriter
J7	FAST	1.4M	20/70	32652	10	Adult books
J6	MEAL	1.2M	20/60	94037	9	Magazines
J5	SORT	1M	20/50	65214	8	Newspapers
J4	HERO	.8M	20/40	78630	7	Newspaper print Paperback books
J3	ROSE	.6M	20/30	52491	6	Telephone book
J2	PONY	.5M	20/25	16378	5	Stock Market
J1	LOVE	.4M	20/20	42903	4	Want ads Births and Deaths

[3]CNIB Reading Test Card: Low Vision (Toronto, Ont.: Canadian National Insitute for the Blind.) Reproduced with permission.

How Impairment Affects Development

As implied in the discussion of clinical and functional assessment, vision-test measurements are not reliable predictors of visual behavior or the development of other behavior. Thus it is important that generalized statements about the effects of any degree of sight loss upon development be preceeded by a disclaimer stating that for some individuals these statements may be inaccurate, and in fact may be quite untrue. Nevertheless, visual impairment tends to slow development, principally when age of onset is early and sight loss is severe in the areas of concept development, life skills, and orientation and mobility.

In order to develop realistic concepts of themselves and their environments, visually impaired students require concrete educational experiences. Concept development involves learning to abstract, generalize, and discriminate among objects. If you have never clearly seen an apple, a tree, or a mountain, your concept, based on incomplete sensory information, could be distorted.

Ongoing assessment of concept development is essential, because students with severe visual impairments may have significant delays compared to their sighted peers. Concept development is necessary in all areas of learning; these include spatial relationships, time, and geographical concepts as well as self-concepts, body awareness, and many others. This subject is discussed further in the chapter on skill development, pp. 39 to 63.

Some visually impaired students also show slow development in the area of independent life skills. For young students, training in basic self-care skills can be provided by the specialist teacher. Secondary students may receive extended life skills training in courses such as Consumer Education, Foods, Clothing, and Industrial Education. A critical element contributing to successful acquisition of functional life skills is the cooperation between the school and the home.

Peripheral vision losses have the greatest effect on the ability to move from place to place. With such defects, it is important to provide orientation and mobility skills training, which assists visually impaired persons to travel effectively and safely in the environment. Skill proficiency will differ with each individual depending on the degree of training efficiency of vision and environmental demands. For some students, orientation and mobility training may begin as soon as they are mobile and will continue throughout adolescence.

Ongoing assessment and instruction by trained instructors is important if independent travel skills are to be achieved.[4]

Visually impaired students also may display developmental lags in interpersonal communication skills and in social and emotional growth. These areas of development are more specifically outlined in "Learning in the School," pp. 19 to 38.

[4]For further information concerning basic orientation and mobility instruction and related services, the reader is referred to Orientation and Mobility Skills for the Visually Impaired (1984), available from the Publication Services Branch of the Ministry of Education.

MULTIPLE IMPAIRMENTS

Neither students nor impairments come in conveniently uniform packages. Even conservative figures indicate that one in three visually impaired students has at least one additional complicating impairment that has a significant effect on learning. Many illnesses or defects affecting the body's nervous system cause not only visual impairment, but defects in motor coordination and in other senses as well. One cannot assume, for example, that the hearing of a visually impaired student is sensitive enough to allow him or her to learn well from talking books (text and leisure-reading recordings on discs or cassettes), or that enough tactile sensitivity is present to allow the use of braille.

It should be kept in mind, as well, that visually impaired students have the same wide range of mental abilities and emotional conditions as do other students -- from mentally handicapped to gifted and from emotionally troubled to emotionally mature.

Handling Multiple Impairments

Secondary handicapping conditions often frustrate a teacher's efforts to compensate for the main impairment. For example, particular subject matter adaptation and skill training may be effective with a visually impaired student, but may not work as well with the student who is also mentally or orthopedically handicapped. Unfortunately, there are no "cookbook" formulas, since the combination of impairments and abilities is unique to each student. However trite it may sound, common sense often leads to a reasonable course of action. The teacher must examine what the student can do and begin from there. Individualization is the key to optimum learning, and the teacher must call on all available resources to provide a program that will enhance each student's total development. The teacher also should keep in mind that visually impaired students have many abilities and interests in common with other students. Such common ground should be used to full advantage.

Published guides and programs tend to be categorized according to the type of handicap, and it might be thought that programs, methods, or techniques developed for a particular category of impairment are not applicable if a student has two or more handicapping conditions. However, close scrutiny will often show that much can be borrowed from a variety of programs originally intended for a particular handicap category.

ADDITIONAL CONSIDERATIONS CONCERNING VISION

Considerations such as type and severity of the visual defect, age of onset, and remaining vision all combine with environmental and intervention factors to determine many things in the visually impaired student's future. One of the most important and fundamental considerations for education is whether the student's principal tool for learning will be braille or print. Again, there are no set formulas. This is an individual matter that ultimately must be decided by the teachers, the parents and, when appropriate, the visually impaired student.

When the decision is made, it will have importance for educational programming. Although some students will function within both categories, most will require service in one of the two major educational categories: print user or braille user. This applies at the kindergarten level of learning as well as at more advanced levels.

One final caution: although a student is committed, even strongly committed, to being a braille learner, he or she must be encouraged to make effective use of residual vision in many other activities.

Learning in the School

Learning in the School

In recent years, the education of students with special needs has moved rapidly in the direction of non-categorical service delivery and increased integration of these students into regular programs. At the present time, nearly all visually impaired students in British Columbia are enrolled in public schools.

These new directions have proved to be effective and beneficial for visually impaired students. As experience with integration has increased, schools have recognized that there are several key factors affecting student success. These include early and continuing counselling of students and parents in order to reduce apprehension about new challenges in the regular classroom, encouraging interaction between visually impaired students and their sighted peers, and ready access to teachers and counsellors for discussion of matters of concern to the student. Other considerations that contribute to successful integration also are discussed in this chapter.

The School Based Team

Teamwork is an essential component in the systematic approach to better educational services for visually impaired students. The team is interdisciplinary, meaning that its members are trained in different fields of study, each coordinating his or her efforts in order to provide an appropriate total educational program for the individual visually impaired student. Each member should have a thorough understanding of the student's strengths and needs, as well as the overall classroom program.

ROLES AND RESPONSIBILITIES

The following pages outline the responsibilities of both the team as a whole and those of its individual members.

The school based team

- reviews referral requests and other pertinent information in order to recommend appropriate educational placement;
- handles the administration and the educational interpretation of formal and informal assessments;
- develops and implements effective individualized educational programs; and
- monitors the progress of each visually impaired student, including revising and updating individual education programs through regular meetings.

Other areas the team may address include

- establishing referral procedures for visually impaired students;
- providing inservice training for classroom teachers, peers, other school staff, and paraprofessionals; and
- acting as a student's advocate in the school and community.

Leadership is an important aspect of the team process. The team leader

- calls team meetings;
- guides and directs discussion;
- facilitates problem-solving during meetings;

- establishes timelines;
- ensures that team decisions are properly implemented; and
- compiles, organizes, and maintains files.

Each member of the team should have a well-defined role, as well as a clear understanding of the parameters of other team members' responsibilities. Because open communication and mutual cooperation are the key to optimal team functioning, the team should meet regularly. In addition, the team might generate role descriptions (see sample listings on the following pages). The range of professionals involved on the team will vary according to student needs and the service model used in a particular school district. Other resource people may include district special services personnel, and professionals from outside agencies such as the Canadian National Institute for the Blind.

Individual Team Members

All individual team members are expected to keep records of the services they provide, as well as the progress made by the visually impaired student. In this way the team can make informed decisions and can be accountable for designing and implementing an appropriate educational program. Some of the responsibilities of team members are listed below.

Classroom Teacher:

- implements goals, adaptations, and recommendations of the team in the classroom
- accommodates individual needs by providing a positive learning environment, which includes making materials available for braille reproduction
- monitors student performance in the classroom setting
- provides feedback on student progress

Specialist Teacher:

- maintains regular contact with the classroom teacher
- provides direct instruction to visually impaired students in specialized skill areas
- makes available appropriate special format materials and consults on their use and interpretation
- provides consultation to school personnel concerning necessary program modification and adaptation to the school environment
- performs functional visual assessment and interprets results of medical reports
- provides specialist services on an itinerant basis within a school district (if there is no resource room teacher within a school)
- translates graphic materials (e.g., assignments, hand-outs, board work, schedules) into a form accessible to

the visually impaired student
- interprets brailled material to the teacher
- may act as a liaison person between parents, school, and community

Principal:

- oversees and expedites planning, organizing, implementing, and evaluating of special services in the school
- acts as a liaison between members of the team, the community, and the family

Parents:

- provide information concerning their child's performance outside the school
- participate with the team in establishing areas of programming priority in the home setting
- implement and continue team recommendations in the home setting

Teacher's Aide:

- works under the direction of the classroom teacher and/or specialist teacher
- prepares materials for the visually impaired student in specialized formats (e.g., braille)

Orientation and Mobility Specialist:

- provides specific skill training in orientation and mobility to the visually impaired student

Student (at junior and senior secondary levels):

- may be a member of the team who can participate in goal setting
- may provide feedback to the team on his or her strengths and needs

Support Services

A variety of support services outside the school are available to the classroom teacher, school personnel, and the family. Just as team planning is necessary at the school level in order to develop a comprehensive and individualized education program, access to additional support services is critical if visually impaired students are to successfully integrate into the sighted community.

The following descriptions outline some services available from provincial and community support personnel.

MINISTRY OF EDUCATION

- The Director of Vision Services is responsible for developing and administering a province-wide plan for the education of visually impaired students. The director also develops provincial standards for special education services and allocates designated funds.

- The Provincial Resource Centre for the Visually Impaired (PRCVI), located on the Lower Mainland, provides specialized materials for visually impaired students throughout British Columbia. A catalogue of materials available for loan is distributed to all school districts and includes student and teacher reference items. Materials are ordered, whenever possible, through the itinerant/teacher specialist.

SCHOOL DISTRICT

Numerous school district special services may be available to schools upon request. Itinerant personnel from different fields may include the following:

- psychologists
- speech therapists
- occupational therapists
- physiotherapists
- counsellors
- specialist teachers of the visually impaired
- orientation and mobility instructors

The supervisor of special services or the superintendent of schools can provide information concerning the extent of special services within the district and, within the constraints of allocated resources, can make available appropriate support on a fee-for-service basis.

COMMUNITY AGENCIES

The Canadian National Institute for the Blind acts as a direct service and information centre for visually impaired Canadians, and professionals. Very often, CNIB social service personnel and children's workers are among the first to offer support and counselling to visually impaired persons and their families.

The Visually Impaired Program of the Vancouver Children's Hospital (VIP) provides an assessment service upon referral by the family doctor and, in some cases, the CNIB. These services include medical, ophthalmological, psychological, speech, hearing, and motor development diagnosis. Recommendations are made available to family and school personnel.

Low-vision clinics located in various parts of the province provide assessments on referral by ophthalmologists and, in some cases, the CNIB. Services involve assessment and recommendations concerning the optimal use of vision, which may include low-vision aids.

A variety of community specialists, such as the following, may be required at various points in a student's development or may offer support throughout most of the student's life.

- Ophthalmologists: physicians who specialize in diagnosis and treatment of all eye defects and diseases by performing surgery and by prescribing glasses or medication.
- Optometrists: licensed non-medical practitioners who provide eye examinations for refraction, muscle balance, and other functional aspects of vision. Optometrists may prescribe glasses and other optical aids.
- Low-vision clinicians who assess and recommend optical aids and environmental adaptations for optimal visual functioning.
- Infant stimulation workers, rehabilitation specialists, and social workers, who can be called upon when required.
- Child development centres throughout the province which provide programs for special needs children, including young visually impaired children.

Planning the Program

Developing an individualized program requires joint decision-making and planning on the part of the school, the home and, where appropriate, the student. Initially, the visually impaired student's strengths and weaknesses should be assessed in order to establish a starting point for planning an appropriate educational program. An instructional plan that outlines specific components will help to provide clear direction for all professionals involved. The critical decision concerning student placement will be determined by the unique circumstances of each student. The following material discusses these factors and highlights issues that arise at each stage in the planning process.

ASSESSMENT

To understand why a visually impaired student functions at his or her current level, the school-based team requires a range of background information from a variety of sources. Assessment is the first step in the teaching process, and is used to establish the unique needs of the student. The purpose of assessment must be clear and the data compiled in such a way as to allow the team to plan both appropriate intervention strategies and an individual education program.

Assessments of visually impaired students should be conducted by the school-based team. Assessments can be formal and informal (accommodating the needs of the visually impaired); ongoing (formative and summative); and designed to assist in programming and intervention decisions.

Several key areas that should be considered when conducting assessments are listed below, including specific considerations pertinent to each area.

Education:

- current level of academic functioning
- rate of learning
- work habits
- preferred learning style(s)
- listening skills
- behavior in school
- attitude
- relationships with peers
- concept development
- special skills (e.g., braille, abacus)
- staff perceptions of the student

Family:

- attitude toward the visually impaired child
- attitude toward visual difficulty
- goals for the student
- student's attitude toward the family

Sight Utilization:

- acuity (distance and near)
- type of correction prescribed
- functional use of vision
- extent to which vision aids are used in and out of the classroom
- etiology and prognosis of visual disability

Physical Skills:

- coordination skills (e.g., posture, movement, mobility, fitness)
- tactile skills
- related physical problems
- fine motor and gross motor skills
- use of the other senses

Psychological Aspects:

- self-concept (including acceptance of impairments)
- motivation
- attitudes toward the sighted
- avoidance behavior
- self-stimulating behavior
- self-responsibility
- sexuality
- sense of reality
- self-control
- manipulation of others

Special Skills:

- daily living
- orientation and mobility
- social

Vocational Aspects:

- career goals
- career awareness
- leisure activities
- work experience

DEVELOPING AN INSTRUCTIONAL PLAN

The Ministry of Education's Special Education Core Curriculum Supplement (1983) states:

> Individual Education Programs (IEPs) are written plans which specify the educational services and learning objectives designed to meet the needs of an individual student. The IEP usually is developed annually at an early point in the school year. The IEP is reviewed and revised as necessary. The development and review of the IEP involves the parents, a multi-disciplinary team of professionals, and the student, when appropriate. The IEP process frequently is coordinated by the student's special education teacher.

The Ministry recommends the use of IEPs with visually impaired students in order to provide each student with a program tailored to specific needs. By carefully assessing current levels of functioning and delineating the skills that the student needs, an effective personalized program can be designed. The IEP is one way to coordinate plans and services. A variety of forms are used throughout the province to record this information. Design is not as important as content, but the document should be easy to read and contain all of the following elements.

Writing the IEP

Developing an Individual Education Program involves the articulation of several components, including

- the student's present level of educational performance (derived from the assessment process);
- long-term, usually annual, goals (broad general statements indicating areas of educational emphasis);
- short-term instructional objectives (specific, measurable and directly related to attaining long-term goals);
- specific special education and related services needed (outlining involvement of team members and relating this involvement to specific goals);
- evaluation procedures that will be used to determine attainment objectives (including dates for review); and
- the required special format materials and equipment necessary to meet objectives (detailed enough to allow continuance of the program should a student change schools).

Services provided to the visually impaired student are contingent upon available resources and skilled personnel to impart the knowledge required. If the team recognizes a need but does not have the resources to provide appropriate services, this information should be recorded on the IEP, thus allowing the team to plan for alternative services. Orientation and mobility instruction will require specific commitment from some team members. This can be written into the IEP as well.

PLACEMENT DECISIONS

The range of educational placements available for visually impaired students varies from district to district. When placing students, the interdisciplinary team should consider

- assessment results;
- additional handicapping conditions;
- age, interest, and social skills;
- orientation and mobility skills;
- the location of the program;
- the attitudes of parents; and
- any special services required.

Placement options currently available to visually impaired students include

- enrollment in a regular class with itinerant or consultative teacher support;
- enrollment in a regular class with support provided part-time in a resource room (which may be available in elementary or secondary schools where the students receive assistance in specific skills training);
- enrollment in a special class with integration into regular classes; and
- enrollment in a special class with participation in some school programs, for social contact.

Once an initial placement is made, the team should set a review date. Care must be taken to ensure that student placement remains appropriate over time. Visually impaired students are more like their sighted peers than unlike them, and it is important to provide programs as similar to regular educational programs as possible.

The Special Role of the Classroom Teacher

The regular classroom teacher's responsibility is to help in the development of the physical, social, and intellectual potential of both normally sighted and visually impaired students. The teacher's acceptance of the visually impaired student as a child or young person with potential to learn, and with responsibility as a peer, will have considerable impact upon his or her acceptance by other students.

One aspect of the teacher's role is to motivate and guide the student's activity in the classroom. This can be best achieved by

- making goals of instruction attainable;
- using a variety of stimulating techniques;
- providing for the student's participation in classroom activities;
- providing enrichment, reinforcement, and extracurricular activities; and
- encouraging the social and emotional growth of the student.

As outlined in the Skill Development section of this resource book, some adaptation in instructional strategies will be necessary to meet the needs of individual visually impaired students. The teacher might consult with the specialist teacher and team members concerning specific adaptive techniques. Many classroom teachers have enjoyed this challenge, and such adaptations frequently are beneficial to all students, and to the school.

Because classroom teachers are in the unique position of seeing the "total child" in a variety of classroom situations, they can best facilitate the smooth transition from one activity to another. Program continuity enhances each student's ability to transfer previous content to new skill and subject areas. Teachers will be called upon to exercise professional judgment when modifying curricula and should not hesitate to do so. It must be acknowledged that the visually impaired student's concepts may be fragmented, and the integration of concepts and ideas is therefore an essential focus for the program.

Many teachers experience some anxiety when asked to assume responsibility for handicapped students. This is a natural response, since there is no doubt that the classroom teacher assumes the greatest responsibility for the visually impaired student's program and must initiate a close working relationship

with the home and with support specialists in order to maximize the effectiveness of all available services. The following suggestions and considerations are provided to assist teachers who are teaching visually impaired students in a regular classroom.

CLASSROOM CLIMATE

Because so much information is learned and reinforced visually, it is an ongoing challenge to know how to communicate an idea using verbal, tactile, and kinesthetic methods. It is important that the teacher be aware of ways to present information and concepts to visually impaired students.

Teachers might remember as well that the nuances of classroom interaction may not be understood by visually impaired students. For example, if a teacher loses his or her temper, then regains composure, this change of emotion must be expressed verbally. Otherwise, with the absence of visual cues, the visually impaired student may continue to believe the teacher to be upset.

Visually impaired students also use non-verbal cues that do not necessarily express the same emotions as those given by sighted students. For example, frustration may be expressed by body tension or shaking rather than facial grimaces.

With regard to classroom organization, it is important that the visually impaired student's desk or work area be situated in a place that is easily accessible and takes into account the nature of the visual impairment. If the student is partially sighted, he or she may be able to see work on the chalkboard when sitting in certain locations. On the other hand, a student might be sensitive to extremes in light and perhaps windows should be avoided. Consult the itinerant specialist concerning the best locations.

Visually impaired students benefit from a situation where routines are established and maintained. A predictable environment increases the likelihood of the student organizing routines in an efficient fashion. Students should be responsible for keeping their work area tidy and their notebooks in good order; daily work should be dated, named, and headed with subject titles. When assignments are completed, students should be responsible for handing them in for marking or interlining (writing of a print copy of braille material produced by a visually impaired student, by a sighted individual adept at braille). The required materials (braille textbooks, dictionaries) are voluminous and demand considerable storage space. Ensure that this space is easily accessible, and that it is kept orderly.

Visually impaired students should become familiar with the location of all furniture and fixtures in the room. If furniture must be relocated, be sure to inform the student. The same familiarization should be provided for bathrooms, hallways, playgrounds, and

other rooms used by the student. Adapted combination locks, when required for lockers, can be purchased through the CNIB, or key locks may be used.

THE BUDDY SYSTEM

Visually impaired students probably will need, in varying degrees, the assistance of "buddies." The buddy system should be planned carefully by the teacher and mutually agreed upon by the students. The teacher will need to monitor the system regularly, keeping in mind the relationship between the buddy and the visually impaired student, the fulfillment of responsibilities, and the rotation of several willing classmates as buddies. It is important, however, to ensure that the visually impaired student becomes independent as quickly as possible.

The Social and Emotional Growth of the Student

Integration into the public school system can be, and often is, a lonely experience for visually impaired students. While it is true that integration is very important to both their social and academic development, it should be remembered that for many visually impaired students it is extremely hard work to behave as the sighted world does. Individual students will vary considerably in the degree of social skill training needed; some low-vision students may be quite socially adept, while more severely impaired students may have to learn social skills that have no natural meaning for them. However, for all visually impaired students the pressure to be part of the group (and they want to be) is enormous, and difficult to achieve.

In order to encourage a better understanding of the nature of visual impairment and its effects, the following material deals with the most common areas of concern for the visually impaired student. Areas considered are the development of independence and positive attitudes, personal growth, and the utilization of effective interpersonal communication skills. Also included are suggested ways of improving or alleviating many of these principally social problems.

INDEPENDENCE AND POSITIVE ATTITUDES

It is essential that parents, teachers, and all personnel working with visually impaired students understand that their knowledge of vision and visual impairment, and their attitudes, have a substantial impact on the student's learning at school and at home.

In order to develop positive attitudes toward others, it is important that visually impaired students have a sense of self-esteem and feel confident about their own abilities. These qualities can be achieved through self-reliance, independence, and acceptance of responsibilities. Students also should have realistic expectations of themselves and others. Without opportunities to develop the positive behavior just described, visually impaired students may become clinging and manipulative, wanting the attention their blindness brings and relying on help because it is easier than learning to do things for themselves.

For students to succeed in daily tasks, they must be encouraged by frequent and meaningful interactions with those around them. Sighted students often look to adults for nods and smiles of approval. Similarly, visually impaired students need approval, which can be in the form of verbal feedback or a physical

equivalent such as a pat, a hug, or a friendly touch. Another effective way of increasing independence and promoting confidence is to encourage effective orientation and mobility training in the home and school.

Parents and teachers should avoid making excuses for students because they have poor vision, and resist the temptation to expect less of visually impaired students than is expected of other students. Ordinary accomplishments need not be considered extraordinary, and performance of any task normally done by peers should be accepted as routine.

INTERPERSONAL COMMUNICATION

Because visually impaired students do not see well, if at all, they often turn their heads away or look at the floor during conversations. This is a distracting habit that can be corrected by teaching the visually impaired student to turn toward the person to whom he or she is speaking.

Voice modulation and its interpretation, and listening skills, also have to be learned by the visually impaired student as part of effective communication. The give and take of conversation can be very difficult for a blind student to grasp. The visual signals that are so much a part of group conversation cannot be picked up easily, and it can be very frustrating not to have this input. Sometimes a visually impaired student will shout, talk incessantly, or enter into conversations without waiting for the right moment. It is important to encourage sensitive listening in conversation, so that the student does not interrupt the flow. The visually impaired student also may need help in learning to interpret the voice modulation of others.

Visually impaired students may seem to drift off into their own world, often because they are not being included and are bored (sometimes it is easier to stop working at being like their sighted counterparts). It should be pointed out that this kind of behavior will only make socializing harder and that they should attend as much as possible to any conversation in which they are taking part.

Sighted students also have a lot to learn about how to make communication with their visually impaired classmates more effective, more pleasant, and more courteous. Visually impaired students often meet with extreme frustration when dealing with an unthinking or ill-educated public; sometimes they find themselves talking to no one when their sighted classmates walk away without making it clear that they are leaving. Common courtesy would tell us not to do this. Yet, because it is common in the sighted world to rely on visual signals to tell the listener that the speaker is moving away, it is a habit that is difficult to break.

Opening and closing conversations should be talked about openly, in order to increase awareness on both sides. For example, just a few words, such as "Johnny, I've got to go now," tells the visually impaired student the conversation is over and prevents the "thin air" scenario from occurring. Something as simple as a greeting like the standard "Hi," also can be a challenge, because even the most brilliant visually impaired person cannot possibly remember everyone's voice and is often left guessing who the "Hi!" came from. Better to say, "Hi, Johnny, it's Mr. Brown." This reduces the pressure and is very helpful.

PERSONAL GROWTH

The development of appropriate self-care skills will enable visually impaired students to take part confidently in many social activities at home, at school, and in the community. The following material discusses several areas pertinent to the visually impaired student's individual development: personal behavior, grooming, sex education, and table manners.

Personal Behavior

Without adequate intervention, some visually impaired students may behave in peculiar and unacceptable ways. "Blindism" is the word used to describe this socially inappropriate behavior.

Some self-stimulating blindisms are repetitive behaviors such as eye-pressing, rocking, hand-flapping, hair twisting, ear pulling, and swaying from foot to foot. These habits are often unconscious, and consistent reminders will be needed to stop them because the visually impaired student will want very much to avoid embarrassment, fit in, and be like the rest of his or her classmates.

Eye-pressing, where the child presses one or both eyes to stimulate the visual system, has been compared to thumb-sucking and seems to provide comfort for the student who is bored, frustrated, or in repose. This behavior should be strongly discouraged when the child is young. However, the urge to eye-press may never leave a visually impaired person. For example, an accomplished blind senior administrator was known to confess that after a particularly hard day she would go home, close her bedroom door, and press her eyes. Nevertheless, to the sighted world, this is a disturbing habit, and visually impaired students should be discouraged from eye-pressing in public.

Grooming

Because good grooming is an important contributor to social acceptance, visually impaired students should be encouraged to develop good grooming habits. They might also be kept aware of fashion trends. Visually impaired young people tend to be

conservative because so much of their life is spent dealing with adults; thus it is important that current fashions and styles be interpreted for them by their peers.

Proper posture and bearing also are skills to be learned, and a pleasant stance and natural manner should be stressed. Orientation and mobility training can help develop a graceful, natural gait and good posture without stiffness. Yoga is a useful method of encouraging body awareness and fluidity that offers an added bonus: it is an activity that can be shared with sighted peers. Visually impaired students should be encouraged to adopt a pleasant expression and to avoid habitual or permanent grimaces. When these do occur, the teacher might gently make the student aware of it until the habit is broken.

Compliments and positive feedback about good physical appearance can mean a lot to a visually impaired student, who perceives none of the approving nods or glances that are a boon to one's self-esteem. Many visually impaired students have a poor self-image and may worry, for example, about their strange eyes, their prostheses, or whether their clothes are right. A few complimentary words can make a great deal of difference.

It should be mentioned that denial of problems associated with visual impairment is common among adolescents with this handicap, and a statement such as "Oh, I know all about that," may not necessarily be true. Students may be embarrassed about their impairment and may be trying to bluff their way through what they feel is a difficult situation. Here, recognition of the problem and some open conversation on the subject would be beneficial.

Sex Education

Sex education for visually impaired students, as it is for all adolescents, is both interesting and sensitive. A counsellor or itinerant teacher might help to reinforce the material taught in class. As well, a frank discussion about personal hygiene in a relaxed and open manner would be beneficial. Puberty often is an emotional and embarrassing time. It is important to avoid unnecessary embarrassment by giving students the information they need. Teachers should become familiar with the school district's policy concerning parental approval for student participation.

A variety of non-verbal ways of expressing affection are used by the visually impaired, including hand-holding, embracing, and kissing. Sighted students and teachers have opportunities to learn when these expressions may or may not be appropriate by observing the behavior of others; visually impaired students may need more direct instruction in order to learn these discriminations.

Table Manners

Because mealtime is a social occasion, table skills are particularly important. If visually impaired students are unpleasant to look at while eating, they will tend to lose any gains made socially in other areas. Visually impaired students can and should be taught that good table manners are important for everyone, and that pleasant conversation at the table will encourage socialization. Where necessary, the teacher might use a hands-on approach to explain and demonstrate basic table techniques. Students also should be encouraged to use their listening skills, which will help them wait for others to be served before beginning a meal, or for a lull in the conversation before asking for items on the table. Cafeterias can pose a problem because food is only presented visually; a buddy to explain what foods are available would alleviate this problem.

Skill Development

Skill Development

Although visually impaired students have unique educational needs, the principles underlying the acquisition of skills are the same for all students. More specifically, current research suggests that instruction can be enhanced if

- it is given at the appropriate level of difficulty;
- specific learning outcomes to be achieved are clearly understood by the student and teacher;
- demonstration and modelling of a new skill is provided;
- adequate guided practice time, accompanied by feedback, is provided; and
- a variety of reinforcement strategies are employed.

These instructional conditions are appropriate for all students. However, classroom teachers are still faced with the challenge of providing appropriate activities, materials, and instructional procedures that match the visually impaired student's learning style.

Due to the nature of the handicapping condition and the often accompanying experiental gaps, visually impaired students of all ages require individualized and intense instruction in four areas of learning that extend beyond the scope of the regular curriculum: concept development, life skills, orientation and mobility skills, and training in the use of specialized equipment and materials.

The following chapter outlines specific subject-area skills for preschool, elementary, and secondary students. The purpose of providing information specific to each subject and age level is to suggest ways teachers can modify and adapt the regular curriculum to meet the needs of the visually impaired student.

Specialized Tools

Visually impaired students will use a variety of specialized tools. Some students will require only a few adaptative tools, while others will use a combination of specialized equipment and materials. This equipment should be easily accessible to the student, and ideally should be given a permanent location. When choosing a suitable place for the equipment, consideration should be given to the accessibility of electrical outlets and whether there is satisfactory lighting and sufficient work space. Precautions should be taken to ensure that the equipment cannot be tampered with or become a hazard. Specialized tools and equipment should be used only by the visually impaired student and by teachers trained in their use.

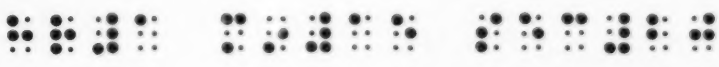
Many of the following specialized tools can be borrowed from the Ministry of Education's Provincial Resource Centre for the Visually Impaired.

Braille

The braille code is a system of raised dots used for reading and braille writing. The dots are arranged in a six-dot cell, in two vertical rows of three dots. The combination of dots within the cell make up the alphabet letters, numbers, and symbol characters of the braille code. Two samples of braille, including their print counterparts, are shown below. (The tiny dots are not part of the code, but have been added to this illustration to portray the dot positions in a "cell.")

Mr. F.C. Jones

1 hr. 15 min. 20 sec.



Notice that in braille there are spaces between words just as there are in print; also that there is sometimes a one-for-one, letter-to-symbol (or cell) correspondence, and sometimes not. This is because braille contains many special symbols and symbol combinations that are either contracted representations of words or special print indicators (e.g., punctuation, format).

Consider, as well, the following points:

- Braille is read with the index fingertips, while the remaining fingers are used as a guide to page orientation.
- Braille requires much more space than print; the braille book sometimes contains two to three times as many pages as a print book. This makes braille extremely bulky.
- Braille is a complex code that is not easy to learn, having many rules, and exceptions to the rule.
- The writing of braille (i.e., producing the embossed dot symbols) is done most often with a mechanical braillewriter, which resembles a typewriter with only six keys, one for each of the dots in a braille cell. A portable device for brief note-taking in braille is the slate and stylus, consisting of a metal frame with openings through which braille dots are embossed with a hand-held stylus.
- Young braille-using students likely will produce all of their work on a braillewriter until they learn to type. A student's braille is often interlined (translated) into print by the specialist teacher or an aide, to enable the teacher to check and mark the student's work.

VersaBraille/Micro Brailler

The VersaBraille machine and the Micro Brailler are advanced electronic aids. They function as a tape recorder-brailler, producing braille on cassette tapes. When coupled with a computer and software, a word-processing system can be devised. These tools are invaluable for secondary and post-secondary students.

Optacon

The Optacon is a portable reading aid available to students who have received extensive specialized training in its use. The Optacon converts ordinary print (which may be varied in size) into a tactile image that can be sensed with one finger. It facilitates a greater independence for the visually impaired student because it provides access to many reading materials, such as card catalogues, that otherwise would be unavailable. It can also be used by the student for proofreading typed assignments.

Tape Recorders/Talking Books

The tape recorder is an invaluable tool for visually impaired students. It can be used effectively to take notes, answer questions, record lectures, or complete exams. Teachers can also use the tape recorder to give feedback, dictate assignments, and record excerpts from texts or journals. Many of the texts, novels, and resource books, particularly for secondary school, are

available in taped format. Resource materials such as encyclopedias and dictionaries are also available on tape.

Closed-Circuit Television

Closed-circuit television (CCTV) electronically enlarges print material onto a TV screen in either black or white. Magnification, contrast, and illumination can be adjusted, and various print sizes and handwriting can be viewed. CCTV is not effective for reading maps or complex charts.

Typewriters

Visually impaired students usually learn to type during the elementary years under the direction of the specialist teacher. Typing reduces the need for braille interlining and enables the teacher to give immediate feedback to the student. Large print typewriters (manual and electric) are available for low-vision students.

Abacus

The Cranmer Abacus consists of beads on a plastic frame that are manipulated by the fingers of both hands. The abacus is not a calculator; knowledge of mathematical facts and concepts is essential in order to understand the functions of the abacus. With the abacus, the student can compute equations for mathematical operations, such as addition, subtraction, division, multiplication, fractions, and decimals.

Talking Calculators

The talking calculator performs all functions of a standard electronic calculator. The decision for calculator use should be the same for visually impaired as for sighted students. There are several types of talking calculators, and others with large print visual displays.

Computer Technology

As computer assisted instruction is increasingly utilized in schools, visually impaired students, like other students, should have access to this type of instruction at school. Technological devices such as voice synthesizers, the Cranmer Modified Perkins Braillers, and appropriate software for braille word processing and typing instruction can be considered.

The Preschool Years

The learning experiences that take place in preschool are particularly important to the growth and development of the visually impaired child. For many visually impaired children the preschool experience is their introduction to peer interaction and to working and playing as a visually impaired child in a sighted world. The preschool program usually requires minimal modification because of its informal nature and its variety in learning experiences. Teachers should encourage visually impaired children to participate in as many of the regular activities as they can. Only by having the children try, can teachers and students come to terms with each child's capabilities. Time should be made available for individualized instruction on visual efficiency, movement, tactile discrimination, and concept development.

During the preschool years, assessments and programs may be established by preschool personnel or infant development workers. Upon school entry, the school-based team can assess concept and skill development and design individualized programs. It is important to keep in mind that instruction should be an ongoing part of a visually impaired student's program if skill proficiency and complex knowledge and understanding are to be achieved. Although daily skill practice is required to maintain academic areas of learning, it is important to achieve a balance of leisure activities and skill instruction throughout the year (e.g., keeping summer holidays for relaxation).

COGNITIVE DEVELOPMENT

Much of a child's beginning language is prompted by first-hand experience and visual interaction with the environment. The visually impaired child who cannot always receive information first-hand and has severely limited visual interactions usually has a delay in language development. Visually impaired children should be introduced to a variety of objects through hands-on experiences to help develop their labeling and questioning strategies. Objects brought into their immediate environment should be discussed in terms of their attributes and functions. First-hand experience and concept development can be increased through planned field trips and informal visits to community shops and offices, as well as to various rooms in the school.

The teacher should arrange opportunities for the child to interact with appropriate peer speech models. Group activities will help develop the concept of conversation, during which time speech inflection, modulation, and fluency can be monitored by the teacher. Many visually impaired children are slow to recognize the use of personal pronouns, although these will emerge through modeling.

The teacher also can monitor the use of descriptive words used in locating. For example, rather than saying, "The blocks are over there," it is better to be specific and say, "The blocks are on the shelf under the window."

To enhance language experiences, the classroom teacher can focus on developing listening skills and encouraging participation. Recordings of environmental sounds, talking toys, story or song tapes, and tactually adapted Language Master cards can be used. Visually impaired children are more dependent on auditory information than other students, and should be taught to use their hearing efficiently. Role-playing, drama and dance exercises, and show-and-tell activities should be included in the program as well. If possible, it is important to emphasize hands-on experience with actual objects.

The visually impaired child should be encouraged to participate in music and dance. Introduction to instruments, rhythm games, finger plays, and dance styles can best be done by hand-over-hand demonstrations. The child should learn to operate tape recorders or record players, although the teacher may want to monitor the volume so that it does not interfere with the child's ability to attend to other environmental sounds.

Motor Skills

Visually impaired children often demonstrate poor physical coordination because of the limitations of their vision, or additional handicapping conditions. Motor skills that are learned by visual imitation such as hopping, running, skipping, or swinging should be taught by direct modeling behind or beside (not facing) the visually impaired child. The visually impaired child should be encouraged to practise his or her newly learned skills and to join in other activities such as bicycling, swimming, and trampoline jumping.

Visually impaired children will require steady encouragement and enhanced motivation in order to develop the fine motor skills essential for later reading and writing in braille. The pincer grasp, for example, may need to be taught and practised. Work places can be defined by using trays or tables with raised edges. A variety of materials such as puzzles, peg boards, or interlocking blocks will help develop finger and hand strength and dexterity.

Some visually impaired children are reluctant to participate in activities that involve the handling of sticky, grainy, wet, or rough textures. This tactile defensiveness occurs because such substances interfere with finger sensitivity. However, they should be encouraged to try clay modeling, papier mâché, or gluing activities, with a good supply of moistened paper towels at hand.

SOCIALIZATION

Visually impaired children often are reluctant to participate in group activities and if left on their own will quickly retreat into their own world, tuning out the action and sounds around them. The teacher must encourage the children to participate by choosing rewards that are attainable and effective.

Discipline for visually impaired children should be consistent with that of other children in the class. It is important, for example, that they learn the consequences of broken rules. Be aware, however, that time out procedures may be rewarding for some visually impaired children, the resulting isolation providing an opportunity to retreat into a fantasy world or to indulge in self-stimulating behavior. Loss of privileges may be more appropriate.

A positive self-image should be reinforced by commenting on the child's physical appearance. School friendships should be fostered, and the children encouraged to share their friendship in after school hours.

LIFE SKILLS

Daily life skills are essential for the development of independence and a feeling of self-worth. Visually impaired children should be taught to care for their own needs through step-by-step demonstrations of eating, dressing, and self-help skills.

Snack routines can provide opportunities to teach skills such as utensil manipulation, cutting, spreading, pouring, and the use of a straw. These are skills that can be task analyzed and taught by hand-over-hand demonstration. The visually impaired child should be instructed in appropriate table manners and posture. The teacher might also introduce the child to new foods, which will provide a basis for discussion on how foods grow and where foods come from.

Just as sighted children learn to dress themselves and master the use of zippers, laces, buttons, and snaps, so should visually impaired children. The teacher should use hand-over-hand demonstrations of the skills necessary to fasten actual clothing articles, rather than using fastener models.

Visually impaired children should learn to look after their own toileting needs. Boys will probably sit down to urinate, rather than stand.

During the preschool years, the home and family are important partners in skill development. Parents and teachers should work together to fill the experiential gaps that visual impairment may have caused.

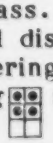
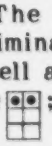
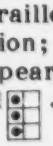
The Elementary Years

Upon entering elementary school, visually impaired students will face many new challenges as they begin to relate to their sighted peers and are expected to acquire academic and social skills. Although certain safety precautions will be necessary, the students should not be over-protected or restricted from participating in regular school activities. Students should be exposed to normal fire drill procedures, for example, though provision will need to be made for planned routes and suitable assistance from peers. Consideration also will need to be given to specialized materials; easy access to storage areas will be necessary.

Team members will set directional goals for program planning. The teacher will require support services to supplement the regular program. The teacher also will need to develop appropriate testing procedures, remembering that consultation with the specialist teacher will be helpful when developing formats for school tests and provincial examinations.

LANGUAGE ARTS: BRAILLE USER

When visually impaired children begin elementary school they will require specialized materials and instruction. The specialist teacher will provide for much of this skill development; however, it will be the teacher's responsibility to implement the program. It should be noted that teachers are not expected to learn braille, though they should be aware of the modifications necessary in presenting language arts programs to visually impaired students.

Presentation of the alphabet in braille may not follow the same sequence as the teacher has set for the class. The braille-using student learns letter recognition by tactual discrimination; therefore, those letters with the most differing cell appearance should be presented first. For example, g  ; c  ; l  .

Because braille alphabet configurations do not resemble the print alphabet, it is not necessary for the teacher to introduce the visually impaired child to the printed letter shape. However, when the student is familiar with the braille code, the raised letters of the print alphabet may be taught (usually by grade 3). It is important for visually impaired children to recognize and reproduce the print letters of their name or initials, because all brailled or typed work should carry each student's signature. The specialist teacher can help students with this skill.

Since the braille code has many abbreviations and contractions, the visually impaired student frequently is exposed to words in a

contracted format (e.g., "today" is contracted to "td"). Consequently, the young reader often has difficulty with decoding and spelling. Along with the difficulties in grasping the braille code, the visually impaired child will have had limited exposure to written words, often resulting in delayed word recognition skills. The teacher can help by using language experience stories, as well as by providing braille sight-word flash cards. The specialist teacher can braille the word lists, using both the print spelling and the braille spelling.

Correct spelling is a constant problem for the visually impaired. The elementary school teacher can help the student by insisting that spelling errors be corrected, and that daily review of difficult words be made. During spelling dictation the visually impaired student should be expected to braille both the braille and print spellings.

The teacher should be aware that punctuation marks are part of the braille code, and that diacritical marks are also represented by braille characters. The specialist teacher should be consulted about the introduction of syllabication, as well as phonic and dictionary skills.

Another important communication skill is the use of the telephone; the skills required to place calls on digital, dial, and pay telephones must be taught. Telephone etiquette skills, including how to place and terminate calls, need to be taught and practised.

Reading braille requires good physical coordination of both hands, as well as finger sensitivity and dexterity. Young readers may frequently lose their place and demonstrate poor reading habits (e.g., "scrubbing" or rubbing their fingers back and forth on a word or character). The primary teacher can provide fine motor activities (e.g., Leggo, puzzles, peg boards) to improve finger dexterity.

While reading orally or silently, visually impaired children will demonstrate a slower reading rate than their sighted peers. They will have difficulty phrasing their sentences, because they will not be able to skim ahead to form phrases. Fluency skills can be developed by permitting the visually impaired child to read stories silently or listen to taped stories prior to reading them orally. The teacher should assign oral reading tasks two or three days prior to the class lesson so that students can practise at home.

The completion of seat work tasks will be done on a brailler (a manually operated machine for producing braille). Visually impaired children will often take longer to complete written activities, because of their slower reading speed. It is important to allow adequate time to complete the tasks, or to reduce the amount of assigned seat work. The teacher should expect quality, though not necessarily quantity, from the visually impaired

student. For example, exercises that involve matching or scanning paragraphs for detail can be very time consuming and the teacher may wish to adjust the activity somewhat.

Successful public speaking is partially dependent on visual cues. For example, a speaker often interprets the non-verbal reaction of his or her audience (e.g., Are they bored or interested?). Visually impaired students should be given opportunities to speak in front of their class or before a group. The teacher can help the students by directing them to keep on topic, to use good posture, and to correct voice modulation.

Maps

Raised-line and tactile maps of most of the major continents are available for braille-using students. Tactile maps convey the same information as print maps; however, it may be necessary to produce several tactile maps in order to convey the information on a single printed map.

Optical Magnifiers

Low-vision students often can benefit from the use of telescopic devices that enlarge distant objects and chalkboard and wall-chart information. Other types of hand-held, stand-mounted, or spectacle-mounted magnifiers are an important alternative to large print books. However, it should be noted that such magnifiers do not give visually impaired people normal vision. With diligent training and practice, some students can learn to use this optically enlarged image to read books with standard print. Optical magnifiers are portable and can be carried easily in a pocket or purse.

MATHEMATICS

Although much mathematical learning is visual, the visually impaired student will be able to grasp mathematical concepts through the use of a variety of hands-on materials. The teacher should supply manipulative concrete objects when introducing any mathemathical concept. Some materials and their possible uses follow:

MATERIALS	USES
- Diene's blocks	- place value, basic operations of addition, subtraction, and multiplication
- Cuisenaire rods	- basic facts (skip counting), fractions
- abacuses and talking calculators	- arithmetic operations
- braille rulers	- measurement
- unifix cubes	- place value, basic operations of addition, subtraction, and multiplication
- brailled flash cards	- basic facts
- brailled grid 0-100	- numbers can be coded to denote odd, even, prime, or composite numbers
- three-dimensional objects (commercial- or teacher-made)	- geometry
- brailled consumable clock-face sheets, brailled/ raised-number clocks	- time
- real coins and bills	- money identification (methods of money organization, such as bill folding can be recommended by the resource person)
- commercial fraction pieces; teacher-made pie pieces cut from paper plates	- fractions
- geoboards	- symmetry and congruence
- Language Master cards	- review of basic facts
- work-tray	- defines work area and confines manipulative objects

The visually impaired student will use a second braille code, called the Nemeth Code, for brailling the number system. This code represents numbers, operations, and functions by the use of braille characters. These characters resemble the literary braille characters and may confuse the student.

The visually impaired student may use an abacus (a tool requiring specific skill development and practice) to compute equations once the basic facts have been learned. Abacus skills should be taught by the specialist teacher.

LANGUAGE ARTS: LOW VISION

The classroom teacher has an important responsibility in encouraging low-vision students to use the vision they have. Because most low-vision students will read and write at a slower rate, they are prone to fatigue during extended seat work activities, and will need a change in activity to reduce fatigue. The teacher should encourage students to use their prescribed electronic or optical aids, though some students may find the aids cumbersome at first. Some students will use closed-circuit television for reading and writing (this electronic aid is complex and will require training by a specialist). An added note: reading at close range using optical aids does not cause vision to deteriorate.

Handwriting is a difficult skill for many low-vision students. Classroom teachers must insist that the student's writing is legible, though they should be aware that emphasis on perfect form and precision is not always realistic. Because students often have more success with cursive writing than with manuscript writing, the teacher may want to introduce cursive skills from the onset of the writing program. It is important to note, as well, that handwriting and copying may take more concentration and time for visually impaired students. Some students will write larger than their peers and may need to use bold-line or raised-line paper. (Consult the specialist teacher when specialized paper is required.)

SCIENCE

Visually impaired students should be introduced to concepts in physical and life sciences through a multisensory approach. It is important that teachers attempt to challenge the students' ears, noses, hands and, whenever possible, their eyes, in making observations and predictions, and in carrying out experiments and drawing conclusions. Because much of science is dependent on visual information, either through pictures or direct observation, it will be important for the teacher to structure the science lesson so that the visually impaired student can participate. The teacher will need whenever possible to verbalize visual content and include concrete objects for hands-on experience.

The specialist teacher can supply the following commercial aids:

- Insect Identification Kit: consisting of five vacuum-formed plastic sheets illustrating a spider, ant, beetle, bee, and earthworm.

- Biological Model Kit: consisting of 19 rectangular shaped models representing invertebrate and plant phyla. Included are the clam, grasshopper, planarian, root, sponge, earthworm (cross-section), hydra, woody stem, flower, starfish, paramecium, root tip, leaf, and bean seed.

- Pull-Apart Cell Model: used to identify basic structural features, both tactually and chromatically.

- Introductory Simple Machine Kit: consisting of lever, pulley, inclined plane, wheel and axle, and wedge.

- General purpose items include the following:
  - liquid level indicators
  - braille rulers, braille tape measures
  - light sensors
  - braille timers
  - adapted thermometers
  - Sewell raised-line drawing kits
  - graph boards, braille/large print graph paper

Teaching in units can help the visually impaired student to organize and integrate his or her experiences. Prior to any experimentation, outline the necessary precautionary measures, and have students work in small groups or with a science partner. Sighted peers can explain some of the observations to the visually impaired student.

Buddies can also help by supplying the necessary verbal explanations when diagrams, charts, or pictures are being used. Some diagrams and charts may be put into tactile form. (Consult the specialist teacher.)

A good resource program for teaching science is Scientific Activities for the Visually Impaired (SAVI), which is divided into four modules: Communication, Structures of Life, Environments, and Scientific Reasoning. This multisensory program was developed at the Center for Multisensory Learning of the Lawrence Hall of Science, University of California.

SOCIAL STUDIES

There is much for visually impaired students to learn about their community and their world. In order to provide a relevant social studies program the teacher will have to draw on concrete resources, offering as much hands-on experience as possible

(e.g., providing fur pelts when studying the fur trade, or snow shoes when discussing modes of travel). Field trips also can be most informative, though the person in charge at the field site should be notified in advance that a visually impaired student is in the group. For example, museums often can provide a tactual display of cultural or historical artifacts.

Daily news and current events will help expand student knowledge. Visually impaired students can report from braille copies or tapes of "big news" items.

Detailed verbal description must be given by the teacher or by a responsible student buddy when visual demonstrations, pictures, films, or slides are being used. The following three-step procedure is effective for giving descriptions:

- Think about the main reason for discussing the picture.
- Provide the student with a statement that will serve as a central focus or organizer for the mental image.
- Relate other objects and people to the organizing statement.

As the student progresses in school, he or she will be required to complete research projects. Material resources, however, are often exhausted quickly for specific topics when braille or tape are used, and the teacher should consult with the specialist teacher for alternate materials. Student buddies also can act as "readers," supplying information from texts not available in braille or tape.

Important aspects of the social studies program are mapping and directional awareness. Skills in these areas will help students become confident about travelling independently in the community. The teacher should consult the specialist teacher in order to acquire commercial or teacher-made maps.

ART

The visually impaired student should be encouraged to participate in art activities. The teacher can provide experiences in coloring, cutting, and folding; these are important skills for the visually impaired student to learn. Coloring sheets can be adapted by making raised or bold outlines. Also, by placing coloring sheets over a screen board, the student can produce a textured picture as he or she uses the colors.

Cutting can be introduced using two-handed scissors. Although perfection in cutting along a line is difficult, the student can have some success when lines are raised by a tracing wheel or dried glue.

Corner-to-corner folding requires a great deal of practice. The teacher can begin by providing a serrated line (made by a tracing wheel) to show the student how to line up the corners.

The most meaningful art activities for visually impaired students are three-dimensional constructions such as papier mâché, clay, or plasticine modeling. Some visually impaired students may avoid activities involving sticky, wet, grainy, or coarse materials, but should be encouraged to try such creative activities.

Discussions concerning use of color are very important for visually impaired students. They should have color words such as white snow, blue sky, or green grass to assist in concept development. Color discussion will help develop a knowledge of which colors can be coordinated.

An excellent resource for suggested art activities is Project Waverley. (See References, p. 73.)

MUSIC

The visually impaired student should be introduced to various instruments, and the sounds the instruments make, by hands-on experience. If a clarinet is being heard from a record, for example, a clarinet should be placed, if possible, in the hands of the student. When learning how to play an instrument, the visually impaired student should have a hand-over-hand demonstration. Songs that are being viewed by the class on charts or song sheets should be brailled. Because many visually impaired students have difficulty with voice modulation, they should learn to use voice control. A music code is available in braille, though this code may be difficult for elementary school children. Students can learn music notation by memory.

The Secondary Years

Throughout the secondary school years, it is important that visually impaired students have the opportunity to plan and to find a future role in sighted society. To accomplish this, students gradually must assume more responsibility for their work and undertake learning experiences that develop independence as well as realistic expectations. Visually impaired adolescents should be encouraged to participate in academic and elective subjects, and extra-curricular pursuits that will provide a balanced perspective for future personal and vocational endeavors. Career counselling in the early secondary years can provide direction for students' vocational goals. In addition, work experience in the later secondary years can offer a variety of opportunities for students to explore work situations in the community.

PROGRAM PLANNING

The junior and senior high school student requires assistance from the counsellor, classroom teacher, and teacher specialist in planning school programs well in advance. The course selection should provide a variety of subjects in each school term. It is important, for example, that the student not be overloaded with several courses that require a considerable amount of reading and writing. Possible reduction of course load may be considered should a student be involved in many extra-curricular activities or have poor health. These decisions are made by parents, the student, the counsellor, and the specialist teacher.

During the time the program is being planned, the specialist teacher will request a list of textbooks and frequently used resource books from the subject teachers. These books will then be ordered from the Provincial Resource Centre for the Visually Impaired in the appropriate format (e.g., braille, tape, or large print). If the subject teacher uses a number of handouts, these assignment sheets could be given to the specialist teacher ahead of time to allow them to be transcribed.

TIMETABLING

In completing the timetable, it is important to include spare periods for study and work. Because more time is required for the visually impaired student to read and complete written assignments, spare periods will provide the extra hours needed to complete class work during the school day, and will allow time after school hours to complete homework.

ASSIGNMENT EXPECTATIONS

It is helpful if the student and subject teacher (and/or itinerant) agree on the length and format of course assignments, and that quality rather than quantity of work is emphasized, recognizing that the student will have a slower reading speed. Teachers should expect the same performance from the visually impaired student as they do from sighted students, except in terms of quantity. The student is responsible for turning assignments in to the teacher in a typed form. It is important that the incorporation of typing into all subject areas be encouraged and expected, unless problems exist in this skill area. (Consult the specialist teacher.)

NOTETAKING

Notetaking can be difficult for the visually impaired student, and must be directly taught. The teacher can help by verbalizing notes as they are written on the chalkboard or overhead projector. The visually impaired student may use one or more of several methods of notetaking: tape recorder, typing, slate and stylus, brailler, or a copy of the teacher's or a buddy's notes. Copies can be made on NCR carbonless paper or they may be photocopied following class time for subsequent transcription into the appropriate medium (e.g., braille or tape).

Notes or assignments that are given to visually impaired students as handouts should be given in advance (at least one week) to the specialist teacher or aide for transcription into braille or another appropriate medium. The teacher should make available copies with clear dark print.

Visual information represented on films, film strips, or overhead projectors can be explained to the visually impaired student by a sighted buddy during the presentation. Tapes used in classroom presentation should be made available to students for home study and review.

RESEARCH PROJECTS

The visually impaired student will need to use a variety of materials and techniques to obtain information for research projects. There are only a limited number of resource books in braille, tape, or large print on a particular topic. One resource to consider is World Book Encyclopedia, available on tape and distributed by the American Printing House for the Blind.

Teachers would be well advised to offer a choice of topics and to suggest alternate means of gathering information (i.e., interview,

public broadcast, or the services of a buddy or volunteer reading aloud). The teacher also could help by reviewing with the student the titles of available books pertaining to the research topic and then cooperatively listing them in order of priority. The student then should read them or have a reader read them.

Again, deadlines may pose a problem. Time extensions or reduced assignments may be required to accommodate the student's slower reading speed.

CLASSROOM TESTING PROCEDURES

Considering the visually impaired student's slower reading speed, sufficient opportunity to complete tests must be given. The teacher may wish to allow the student two sessions for test completion, provided proper supervision is available.

Visually impaired students have difficulty skimming materials and as a result have a great deal of difficulty completing multiple choice or matching questions. Questions requiring short answers are preferable.

The teacher should give the exam paper to the itinerant teacher or aide in advance (at least one week) for transcription into an appropriate medium (i.e., braille, large print, or tape). The exam question-and-answer format should be agreed upon by the teacher and student in advance.

Like other students, visually impaired students are required to take provincial exams at the senior high school level. Brailled exam papers are provided by the Ministry of Education, and registration is outlined in Ministry circulars. However, since modifications to the test and testing procedures will be necessary, the results should not be included in provincial norms.

STUDY AND STORAGE AREAS

As has been stated previously, teachers concerned with the visually impaired student must make sure that adequate and appropriate provision is made for the storage of braille volumes and specialized equipment, and that an adequate work place is provided. If it is feasible, make a work room available to the student for spare study periods and special skill instruction, giving consideration to its size and location, the lighting, and access to necessary power outlets. If no room is available, classroom shelving in one location should be made accessible to the student for book and equipment storage.

SUBJECT ADAPTATIONS

English

The teacher should not hesitate to include the student in all writing exercises, from brainstorming to group evaluation, and to expect the same quality of involvement and production. Reading assignments should be made well in advance, especially in the reading of novels. Students will use braille and/or tape to read assignments.

Visually impaired students may use tape recorders or braillers when writing a rough draft, but final draft copies should be submitted in type. Because spelling skills may be weak, the teacher might consider helping the student develop vocabulary word lists. Explanations of disparities between word sounds and spelling can be useful, as well as verbalizing the use of words in context. Dictionaries and thesauri can be acquired in braille and large print. Diacritical marks are characterized in braille. Remember that punctuation marks are part of the braille code.

Mathematics

The visually impaired student should have acquired the necessary adaptive skills required in math by the time he or she is in junior high school. Although math is visual and requires chalkboard explanations, most concepts can be explained verbally or by using adapted math aids such as brailled graph paper and braille geometric equipment. (Consult the specialist teacher.) A student buddy can often supply verbal explanations. The visually impaired student will use a brailled math text and compute his or her equations on an abacus, talking calculator, and/or brailler.

Visually impaired students will require one-to-one assistance when they are introduced to geometry, and will use the adapted tools for exercises such as measuring angles and constructing polygons. Two-dimensional diagrams can be reproduced by using a raised-line drawing kit. Algebra should not require many adaptive tools; algebraic equations and expressions can be represented on a brailler.

Social Studies

Social studies teachers need consider only some minor modifications to their teaching strategies when including the visually impaired student in their program. Whenever possible, a hands-on approach to cultural or historical artifacts might be provided. Contact local art galleries and museums. Because many visually impaired students have limited experiential backgrounds, it is useful to give detailed verbal descriptions concerning the cultural, ethnic, or technological differences of the people being studied. If historical maps or documents are not available on tape or in braille, encourage group work, where group members can read or

interpret information while the visually impaired student records notes. A student buddy can also provide any explanations necessary during slide or film presentations. The availability of good braille, tactile, and print maps is limited, though some maps may be acquired (consult the specialist teacher) or produced by an aide or the itinerant teacher. Tactile globes expressing the continents geographically and giving lines of longitude and latitude also are available. Map information can be represented by taped descriptions.

Visually impaired students can use adapted materials for graphing and charting activites (e.g., brailled or large print graph paper, raised-line drawing kits, braille rulers). (Consult the specialist teacher.)

Current events reports can be made from comprehensive radio or television broadcasts, rather than from the newspaper.

Science

Junior secondary science teachers need to consider some modifications to their teaching strategies when including a visually impaired student in their program. For example, the hands-on approach of scientific experimentation using a model is most beneficial for the visually impaired student. During demonstrations the teacher can give detailed verbal explanations of the step-by-step procedure while the student simultaneously follows each step with a concrete model. Prior to the visually impaired student participating in any experiments, the teacher should use discretion, and outline the necessary precautionary measures. A reliable lab partner might be assigned to the student as well. Adaptive science tools such as light sensors, liquid level indicators, and biological model kits may be acquired. (Consult the specialist teacher.)

The success of visually impaired students in the senior secondary science program will depend largely on motivation and on their interest in scientific observation and exploration. Although much of science requires visual observation, visually impaired students can use adaptive materials and verbal explanations to augment information. By using analogies, conceptual models can be extended, enabling students to refer to their previous knowledge.

Although teachers can make adaptive materials for science activities, they also can consult the Provincial Resource Centre for the Visually Impaired and/or the specialist teacher for available items.

Home Economics

Most visually impaired students will have acquired some domestic skills from home experience. However, for those visually impaired students with little or no domestic skills, there will be a need to teach the prerequisites of the skills used in home economics. Domestic skills need to be taught in the context of their functional

application. The visually impaired student should be introduced to the layout of the kitchen and sewing lab before regular class time.

Foods:

Drawers, cupboards, and staple ingredients may be given braille labels. Stove elements and oven dials may be adapted so that settings may be read tactually. Adapted timers, braille cookbooks, specialized utensils, and egg separators are available. (Consult the specialist teacher.) All students should be shown the precautionary measures necessary when using electrical equipment. Cooking-lab partners can help by explaining their portion of the cooking so that the visually impaired student will know the procedural steps involved in the lab. The visually impaired student can benefit by being involved in cooking-lab demonstrations, though it is important that the teacher verbalize each step of lab preparation. For partially sighted students, closed-circuit television (CCTV) can be helpful for viewing demonstrations from a distance.

Clothing and Textiles:

Drawers and cupboards may be given braille labels. Adaptive sewing tools (e.g., needle threaders, self-threading needles, seam guides) can be acquired. (Consult the specialist teacher.) The student using a sewing machine should be shown precautionary measures, as well as how the machine runs and how to thread it. An attached magnifier may benefit some visually impaired students. Use heavy paper for patterns; a student buddy can provide the necessary one-to-one help in laying out the pattern. Knitting and other forms of needle work can be successfully accomplished by some visually impaired students.

Typing

Typing is a necessary basic skill for visually impaired students, who can learn to type using the same touch system as their sighted peers. Reading stands, large print, and dicta-type attachments may also be used.

Because typing produces a visual response, teachers will need to provide frequent verbal feedback and encouragement to maintain student motivation. Typing teachers might consult the itinerant teacher to discuss any necessary modifications or adaptations to the program.

Industrial Education

Visually impaired students should be introduced to the layout of the industrial education shop before class time and, where necessary, to storage cupboards, shelves, and bins given braille labels. Adapted tools such as brailled squares, measuring tapes, and mitre boards are available. (Consult the specialist teacher.)

The shop should be kept well organized and safety procedures stressed, as they are with all students.

Visually impaired students should have hands-on experiences whenever possible (e.g., tool identification). The teacher also may include the student during the project demonstrations, through hands-on experience of each completed stage of the project and by verbalizing each step. Closed-circuit television may be helpful, as well, allowing partially sighted students a close view of the project.

Visually impaired students may require one-to-one assistance when introduced to the operation of hand tools or machinery. It is important to show students the precautionary measures necessary when working with or near operating machinery. A shop partner will be necessary.

Consumer Education

Visually impaired students may have had some familiarization with consumer skills. However, for those students with little or no prior consumer experience, course prerequisites will need to be taught. These skills will involve money identification, basic money management, banking, and concepts concerning the value of money. Large print and raised-line cheques are available from most banks. Some application forms, bank forms, or resource material may be reinforced for the visually impaired student by supplying a brailled or taped format.

Many consumer skills are visual, and as a result, many of the practical experiences will need to be verbalized for the students. It is important that consumer skills be taught in the context of their functional application.

Drama

Drama provides a good source of artistic expression and communication for many visually impaired students. Mime may require some verbal or physical prompting such as placing the student's hands in the proper position or allowing the student to physically feel the degree of muscle tension in the face while various emotions are expressed. Speech projection and articulation can be monitored with tape recorders. Tapes also can be used for material needing to be memorized, or for providing models of voice patterning, projection, and elocution. Dramatic expression should take place in an uncluttered, safe environment in which the student can move freely through space. Encourage the student to express emotions in dramatic exercises; also offer constructive criticism with physical demonstrations and oral suggestions.

Art

Much of the success in the art program will depend on the expectations of the teacher, and the student's motivation and interest. Students should have the opportunity to identify and explore a variety of tools and materials in order to understand how they contribute to various artistic techniques. Graphics can be represented on foil paper or by providing raised-line drawing kits. (Consult the specialist teacher.) Printmaking projects can be successfully accomplished by using texture in ink or glue (e.g., sand, sawdust). Experimentation with alternate media (e.g., soapstone, clay), and demonstrations of basic techniques with three-dimensional art, can provide exciting and successful art experiences for visually impaired students.

Music

Many visually impaired students are talented, and interested in music, and should be encouraged to participate in music classes.

Visually impaired students may be interested in belonging to a musical group. The teacher will need to use a code of raps on a music stand instead of a nod or hand gesture for signaling.

The teacher might include the student in instrument identification by using real models for hands-on experience, along with recordings of the instruments. When introducing the playing of an instrument, hand-over-hand demonstration is often necessary.

Music notation can be brailled, though reading the music codes requires well-developed braille skills. Most visually impaired students rely on memory, tape, or enlarged print copies of music notation. It may be difficult to find braille music transcribers; some compositions are available in braille through CNIB services.

Glossary[5]

Accommodation	the ability of the lens to adjust its shape by action of the ciliary muscle for vision at various distances in order to produce a clear image on the retina
Amblyopia	dimness of vision without any apparent cause (such as the inability to recognize letters) see types: refractive, sensory, strabismic
Aniridia	absence of the iris at birth
Anophthalmos	absence of a true eyeball either at birth or after removal by surgery
Anterior Chamber	space in front portion of the eye between the cornea and iris and filled with aqueous humor
Aphakia	absence of the crystalline lens either at birth or after surgery
Aqueous Humor	clear, watery fluid that fills the anterior chamber and the posterior chamber in the front part of the eye
Astigmatism	defects of the curvature of the cornea or lens resulting in a distorted image because light rays cannot focus on a single point of the retina
Binocular Vision	coordinated use of the two eyes to see a single fused three-dimensional image

[5]Excerpted from "Understanding Eye Language" (National Society to Prevent Blindness, New York, 1977), n.p. Reprinted with permission.

Buphthalmos	large eyeballs in an infant and usually a result of secondary glaucoma
C, CC	used by eye specialists to indicate "with correction"
Cataract	opacity or cloudiness of the crystalline lens that blocks the passage of light rays limiting vision
Central Visual Field	the area of objects in space seen without moving the head or eyes; corresponds to an area within 30 degrees of the fixation point (fovea)
CF	used by eye specialists to indicate "counts fingers," meaning visual acuity is low
Choroid	the middle covering layer of the eye containing blood vessels which furnish nourishment to the other parts of the eye, especially the retina
Coloboma	defect in which part of a structure of the eye is absent at birth
Cones	cone-shaped nerve endings in the retina particularly in the macula area (cones work best in daylight with a small pupil allowing one to make out details and shapes and specially colors)
Congenital	present at birth
Conjunctiva	the delicate mucous membrane which lines the eyelids and covers the front part of the eye, except the cornea
Cornea	the clear transparent curved covering on the front of the eye; a refractive surface through which light enters

Crystalline Lens	a transparent, colorless disk, suspended in the middle of the eye behind the iris by the suspensory ligaments, which brings rays of light to focus on the retina; a refractive surface of the eye
Depth Perception	the blending of slightly dissimilar images from the two eyes for the perception of depth and solidity; see stereopsis
Diabetic Retinopathy	the continuum of changes in the blood vessels of the retina occurring in some patients with diabetes; blood vessel abnormalities may be confined within the retina or they may be on the surface of the retina and within the vitreous cavity
Distance Vision	ability to distinctly perceive objects at a distance, usually 20 feet
Field of Vision	the entire area that can be seen without shifting the gaze (i.e., without moving the head or eyes)
Fixation	directing the eye to an object so its image, in the normal eye, centers on the fovea
Fusion	the combination of the separate images in the two eyes into a single mental image
Glaucoma	eye disease associated with excessive pressure within the eye, from accumulated aqueous humor, causing a wasting away of the optic nerve and defects of the visual field
HM	used by eye specialists to indicate "hand movements"
Intraocular Pressure	IOP; the pressure of the fluid (aqueous humor) within the eye

Iris	the colored circular membrane which hangs in front of the lens and controls the size of the opening at its center (pupil), thereby regulating the amount of light entering the eye
Jaeger Test	near-point reading test chart printed with lower-case letters of various sizes
Keratoconus	an abnormal conical protrusion and thinning of the cornea accompanied by decreased visual acuity and marked astigmatism
Legal Blindness	central visual acuity does not exceed 20/200 in the better eye with correcting lenses or the fields of vision are so limited that the widest diameter of visual field subtends an angle no greater than 20 degrees; includes severe vision impairment and blindness, or total lack of vision; definition used by most stages and the federal government for legal purposes, such as aid to the blind, income tax exemption, and special education materials
Low-vision Aids	powerful optical devises useful to persons with a vision impairment that is not successfully corrected by the usual prescription lenses
LP	notation used by eye specialists to indicate light perception or the ability to distinguish light from dark
Macula Lutea	a yellow spot; rodfree area at the center of the retina that surrounds the fovea and is responsible for clearest central vision
Macular Degeneration	central vision impairing condition caused by alteration in vascular supply to the retina

Microphthalmos	an abnormally small eyeball present at birth
Myopia	see nearsightedness
Nearsightedness	myopia; a refractive error of the eye where the image of a distant object (more than 20 feet) is formed in front of the retina and cannot be seen distinctly
Near Vision	the ability to perceive objects distinctly at normal reading distance (usually about 14 inches from the eye)
Night Blindness	a condition in which sight is good by day but deficient at night and in any faint light
NLP	used by eye specialists to indicate inability to distinguish light from dark; "no light perception"
Nystagmus	involuntary, regular, rapid movement of the eye, which may be horizontal, vertical, circular, or mixed
OD	oculus dexter; used by eye specialists to designate right eye
Ophthalmologist	(oculist); a doctor of medicine (M.D.); a physician licensed to practice medicine and surgery who specializes in the diagnosis and treatment of diseases and defects of the eye (in treatment, the ophthalmologist prescribes medicines, glasses, contact lenses, prisms, exercises, and other therapies, and performs surgery)
Optic Atrophy	the wasting away of the optic nerve fibers causing visual loss

Optician	one who fits, adjusts, and dispenses glasses, and other optical devices on the written prescription of a licensed physician or optometrist
Optic Nerve	the special nerve of sight beginning in the retina as the optic disk, which carries messages from the rods and cones of the retina to the brain resulting in visual images
Optometrist	a doctor of optometry (O.D.); a licensed, nonmedical practitioner, who measures refractive errors (i.e., irregularities in the size or shape of the eyeball or surface of the cornea) and eye muscle disturbances (in treatment, the optometrist prescribes glasses, contact lenses, prisms, and exercises)
OS	oculus sinister; used by eye specialists to indicate the left eye
OU	oculus unitas; used by eye specialists to indicate both eyes together or oculus uterque, each eye
Peripheral Vision	the ability to perceive the presence of motion or the color of objects outside the direct line of vision
Photophobia	abnormal sensitivity to and discomfort from light
Posterior Chamber	the space between the back of the iris and the front of the crystalline lens
Prosthesis	an artifical substitute for a missing body part, such as the eye
Pupil	the opening in the center of the iris which appears as a black dot and through which light enters the eye

Refractive Amblyopia	a marked difference in vision of the two eyes so that the image transmitted by one eye is ignored, with dimness of vision resulting in that eye
Refractive Error	a defect in the eye that prevents light waves from being brought to a single focus exactly on the retina
Retina	the innermost coat of the eye containing light-sensitive nerve cells and fibers connecting with the brain through the optic nerve and nourished by a network of blood vessels; receives image and sends it to the brain
Retinitis Pigmentosa	an hereditary degeneration and atrophy of the light-sensitive cells of the retina which begins as night blindness but which results in a gradual loss of vision
Retinoblastoma	a malignant tumor arising in the retina; probably present at birth but usually arising in childhood
Retrolental Fibroplasia	RLF; disease of the retina in which a mass of scar tissue fills the space between the back of the lens and the retina; associated with premature birth and excess oxygen inhalation
Rods	light-sensitive nerve endings at the edge of the retina which work best in darkness so there is great sensitivity to light for perception of motion
Sclera	the white part of the eye; a tough covering with which the cornea forms the external protective coat of the eye
Scotoma	a blind or partially blind area in the visual field surrounded by an area of normal vision

Snellen Chart	a chart for testing central visual acuity on which lines of symbols (letters, numbers, E's, pictures) are printed in graded sizes with the largest symbols at the top of the card; each symbol has the overall height and equal weight; each size marked for distance at which it can be read by the normal eye (see 20/20 vision)
Strabismus	inability of both eyes to look directly at an object at the same time
Sty	hordeolum; inflammation of one or more of the sebaceous glands of the eyelids, producing pus, and usually due to an infection
Tunnel Vision	gun-barrel vision; visual field contracted to give impression of looking through tunnel
20/20 Vision	the ability to correctly perceive an object or letter of a designated size from a distance of 20 feet; normal visual acuity
Visual Acuity	measurement of the ability of the eye to perceive the shape of objects in the direct line of vision and to distinguish detail; generally determined by finding the smallest Snellen symbol that can be recognized

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4000 Albemarle St. N.W.
Washington, D.C. 20016
U.S.A.

Journal of Visual Impairment and Blindness
American Foundation for the Blind
15 W. 16th St.
New York, N.Y. 10011
U.S.A.

The Sight-Saving Review
National Society to Prevent Blindness
79 Madison Ave.
New York, N.Y. 10016
U.S.A.

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